a

	Shape Mode 1	Shape Mode 2	Area (μm^2)	Aspect Ratio	Front Radius (μm)	Front Roughness	Speed ($\mu m/sec$)	Angular Speed (degrees/sec)	
Untreated Live Cells	0 ± 1	0 ± 1	403 ± 164	1.86 ± 0.46	23.6 ± 12.2	1.96 ± 1.68	0.18 ± 0.07	0.29 ± 0.30	n=400
Stained (Kabiramide C)	0.09 ± 0.91	−0.24 ± 0.97	428 ± 153	1.81 ± 0.46	23.6 ± 12.0	2.06 ± 1.51	0.19 ± 008	0.36 ± 0.44	n=295
Fixed (4% Formaldehyde)	0.05 ± 0.80	−0.42 ± 0.95	427 ± 145	1.74 ± 0.39	21.6 ± 9.3	2.23 ± 1.54	NA	NA	n=201
Latrunculin 10 nM — sequesters actin monomer	0.09 ± 0.87	−0.18 ± 0.874	426 ± 156	1.79 ± 0.34	21.0 ± 7.6	1.79 ± 0.75	0.13 ± 0.06	0.33 ± 0.51	n=144
Cytochalasin D 1 µM — caps actin filaments affects nucleotide hydrolysis	−0.09 ± 0.84	−0.46 ± 0.71	410 ± 154	1.63 ± 0.25	18.8 ± 5.9	2.02 ± 1.14	0.12 ± 0.06	0.36 ± 0.53	n=77
Jasplakinolide 500 nM — stabilizes actin filaments	0.16 ± 0.95	0.15 ± 0.88	422 ± 142	1.95 ± 0.42	24.7 ± 10.1	1.65 ± 0.96	0.15 ± 0.05	0.34 ± 0.50	n=85
Blebbistatin 50 µM — inhibits myosin II	−0.18 ± 0.89	−0.10 ± 0.91	380 ± 148	1.71 ± 0.32	18.7 ± 7.1	2.15 ± 0.87	0.12 ± 0.06	0.19 ± 0.24	n=112
Calyculin A 25 nM — enhances myosin II activity	0.14 ± 0.68	−0.09 ± 0.81	427 ± 127	1.84 ± 0.31	22.2 ± 6.5	1.74 ± 0.81	0.27 ± 0.09	0.45 ± 0.89	n=133

mean ± standard deviation

significant decrease from untreated   no change from untreated   significant increase from untreated

b

Figure S1 – Molecular perturbations shift cell populations in distinct but subtle manners.
(a) Shown are the mean ± standard deviation of each of the measured properties for cell populations under different molecular perturbations. Significant changes in means ($p<0.05$; determined from a bootstrap confidence interval on the difference in means) are colored and shown in bold face. At the right of the table a dendrogram shows the relationship between the different perturbations as determined by average-linkage hierarchical clustering based on the Mahalanobis distance between the mean measurement vector for each perturbation.
(b) Molecular perturbations have only a modest effect on cell shape. The top row shows the mean shapes of populations of cells treated with different agents at least 10 min before imaging; the mean shape of the unperturbed population is superimposed (dashed line). In the lower rows, the first and second principal modes of shape variation in these populations are illustrated by superimposition of the mean shape and shapes at one and two standard deviations away from that mean along each mode.